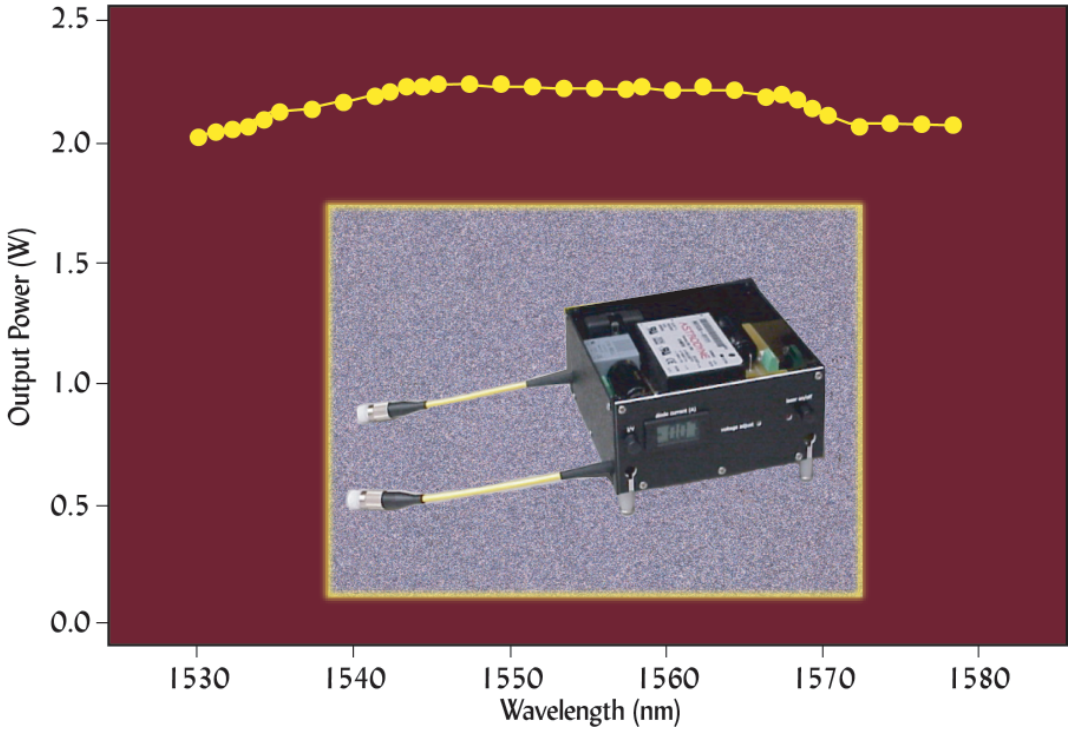
Side-Pumped Fiber Amplifiers for Lasercomm



Free space laser communications require reliable high power fiber lasers to overcome both propagation losses and scattering in the atmosphere and to enable higher bandwidths. For lower power fiber lasers (less than 1 Watt) the conventional approach of end-pumping the fiber using diode lasers works well; however, for scaling to powers greater than 1 Watt, this approach fails.

The high power fiber laser technology from the Naval Research Laboratory (NRL) is based on a new method for pumping double-clad fibers using diode lasers, diode bards, or fiber-coupled pump sources. In this approach, called Embedded-Mirror Side Pumping (EMSP), a mirror is embedded in the inner cladding of a DC fiber. The pump source is brought into close proximity to the mirror without intervening optical elements and the pump beam is launched into the inner cladding by reflection from the mirror. This approach is scalable and easily manufacturable. In addition, the pumping geometry has generous alignment tolerances leading to long-term reliability.

NRL has used EMSP to construct Yb and Er/Yb-doped fiber amplifiers for operation at 1.04 to 1.10 mn and 1.53 to 1.58 mn wavelength ranges, respectively. Output powers are 2.5 Watts at 1550 nm and 10 Watts at 1000 nm. The amplifier is ruggedly packaged in a box that includes the diode power supply, cooling system, and all electronics required for monitoring and control; the packaged amplifier requires a single power source (120 V ac in this case). The exterior dimensions of the NRL package are 11 cm x 11 cm x 6.3 cm (including the fans), and the total weight is 0.78 kg.

For more information please contact:

Dr. Jeff Koplow
Naval Research Laboratory
Code 5654
4555 Overlook Ave., SW
Washington, DC 20375
202-767-9519
koplow@nrl.navy.mil

Powered by Naval Research TM/SM